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TO: EXAMINER: Lourdes C. Cruz

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SERIAL NO.: 09/412,261

FROM: Aaron Waxler

REGISTRATION NUMBER: 48,027


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I certify that these documents consisting of 29 pages (including this cover sheet, a notice of appeal, and an appeal brief filed in triplicate) is being transmitted via facsimile to the United States Patent and Trademark Office at the telephone number set forth above on 18 March, 2003.


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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Atty. Docket

PIERRE BAUDET ET AL

PHF 98,601A

Serial No.: 09/412,261

Art Unit: 2815

Filed: October 5, 1999

Examiner: L. CRUZ

Title: SEMICONDUCTOR DEVICE WITH INTEGRATED CIRCUIT ELEMENTS
OF GROUP III-V COMPRISING MEANS FOR PREVENTING
POLLUTION BY HYDROGEN

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Commissioner of Patents and Trademarks
Washington, D.C. 20231

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NOTICE OF APPEAL

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Sir:

Applicants hereby appeal to the Board of Patent Appeals
and Interferences from the decision dated December 18, 2002 of
the Examiner finally rejecting Claims 1 and 3-7. Filed herewith
is an Appeal Brief.

[X] Please charge the fee of \$320.00 to Deposit
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[] No additional fee is required, because the
fee was paid in a prior appeal.

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Respectfully submitted,

By


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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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APPELLANTS' BRIEF ON APPEAL UNDER 37 C.F.R. § 1.152 TECHNOLOGY CENTER 2800

Sir:

Appellants present their brief on appeal as follows:

REAL PARTY OF INTEREST

The real party of interest is the assignee, U.S. Philips
Corporation, and not the parties named in the above caption.

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RELATED APPEALS AND INTERFERENCES TECHNOLOGY CENTER 2800

With regard to identifying by number and filing date all
other appeals or interferences known to appellants which will
directly effect or be directly affected by or have a bearing on
the Boards' decision in this appeal, Appellants are not aware of
any such appeals or interferences.

STATUS OF THE CLAIMS

Claims 1 and 3-7 stand rejected and are appealed.

STATUS OF AMENDMENTS

No amendment after final rejection has been presented subsequent to the final rejection.

SUMMARY OF THE INVENTION

The present invention is directed to a semiconductor device composed of a stack of layers on a substrate (1) of an insulating material. A stack of layers (2, 3, 4a, 4b, 5) forms the semiconductor device. The stack also includes regions (17) for lateral insulation of a circuit element from other elements as well as an active region (12) for realizing a circuit element. A layer (10) of hydrogen-absorbing material is deposited atop an insulation region (17). An external surface (11) of the hydrogen-absorbing layer (10) is exposed to the environment of the semiconductor device inside a housing enclosing a portion of the semiconductor device such that the hydrogen absorbing layer (10) prevents pollution of the circuit elements and the substrate by hydrogen.

THE ISSUES

- I. Whether under 35 U.S.C. § 102(e), U.S. Patent 5,861,665 (Derkits) anticipates every element of Claims 1, 3-5, and 7 of the invention.

II. Whether under 35 U.S.C. § 102(b), European Patent EP 0513894 (Wolters) anticipates every element of Claims 1 and 4-6 of the invention.

PRIOR ART

1. U.S. Patent 5,861,665 (Derkits)
2. European Patent EP 0513894 (Wolters)

GROUPING OF CLAIMS

With regard to the rejection of Claims 1 and 3-7 under 35 U.S.C. § 102, the claims stand or fall together.

ARGUMENT

- I. Whether under 35 U.S.C. § 102(e), U.S. Patent 5,861,665 (Derkits) anticipates every element of Claims 1, 3-5, and 7 of the invention.

Derkits fails to anticipate all the elements of the invention of Claim 1.

Derkits fails to recite or suggest a hydrogen getter integrated with the circuit elements. Rather, Derkits provides "a member, separate from the components, which comprises a first layer of material which forms a hydride when subject to solvated hydrogen" (Col. 1, lines 30-33). The Final Office Action, dated December 18, 2002, argues that Derkits discloses layer 33 in Col. 2, lines 55+. However, Derkits' layer 33 is on a substrate bonded to a lid (see, e.g., Col. 2, lines 37-42). Further, Derkits teaches away from Appellants' invention by

specifically separating member 31 from the components (see, e.g., Col. 3, lines 27-28). Although Derkits recites "a member, 31, ... could be mounted anywhere in the cavity" (col. 2, lines 25-27), it is Appellants' understanding that "in the cavity" (ibid.) means "attached to one of the package inner walls or to the lid" (col. 3, lines 19-20). Consequently, Derkits' device requires more complex formation procedures (i.e., forming a hydrogen getter on the sides or lid of the housing) and lacks the advantage of preventing the neutralization of charges in the metal layers or interfaces thereof either at its surface or within the material itself.

The aforementioned Final Office Action additionally argues that the prior art teaches a getter within the same package, however, "integrated with the circuit elements" is substantially different than "integrated in the same IC package". Expressing that the former is identical to the latter is akin to suggesting that a lamp on the ceiling of a room is integrated into the floor of the room. Appellants respectfully note that components 12, 13, and 14 of Derkits and member 31 which contains hydrogen getter 33 are separate, as indicated in Fig. 2. Consequently, the rejection of Claim 1 as being unpatentable over Derkits is believed untenable and the invention is believed patentable for at least these reasons.

The Final Office Action responds to Appellants argument by claiming the prior art teaches a getter within the same package as the IC. However, simply because a getter is in a package

does not remove the significance of where the getter is placed because that location can have an effect on conductivity, effectiveness, and ease of manufacture. Appellants respectfully submit that the relevant test for novelty under 35 U.S.C. § 102 is whether the prior art recites all elements of a claim. Here, this is not the case, as Derkits fails to recite a hydrogen getter integrated with the circuit elements.

Claims 1, 3-5 and 7 are believed patentable over Derkits for at least these reasons.

- II. Whether under 35 U.S.C. § 102(b), European Patent EP 0513894 (Wolters) anticipates every element of Claims 1 and 4-6 of the invention.

Wolters also fails to recite or suggest a hydrogen getter integrated with the circuit elements. Walters shows hydrogen-absorbing coating layer 30 sandwiched between insulating layer 40 and electrode 13. However, this configuration may cause the capacitor to short-circuit. To prevent such short-circuiting, Wolters includes "an insulating auxiliary layer... between the hydrogen-absorbing layer and the surface of the semiconductor body" (col. 4, lines 37-40). This auxiliary layer can be seen in Fig. 5 of Wolters where the hydrogen-absorbing coating layer 30 is sandwiched between insulating layers 40 and 50. As stated in Appellants' specification on page 2, paragraph 3:

Experiments have shown that the use of a metal layer made of a hydrogen-absorbing metal sandwiched between two insulating layers so as to form a composite film covering the integrated circuits has a detrimental influence on the

integrated circuit because this composite film constitutes a strong parasitic capacitance which downgrades the performance levels of all elements of the integrated circuit even at room temperature. Such a layer realized in accordance with the cited patent application should accordingly be steered clear of altogether.

Consequently, Wolters teaches away from Appellants' claimed invention.

Further, Wolters does not protect against hydrogen poisoning from the protective housing because no part or surface of the hydrogen-absorbing coating layer 30 is exposed. Consequently, Wolters' device lacks the advantage of preventing the neutralization of charges in the metal layers or interfaces thereof either at its surface or within the material itself. The Office Action argues that the environment is not defined in such a way that Wolters would not anticipate the invention and that Wolters' layer is exposed to adjacent parts of the circuit elements. Appellants respectfully submit that Page 3, lines 29 et seq. indicate that "hydrogen from the environment is understood to mean the hydrogen which is enclosed together with the integrated circuit device inside a hermetically sealed protective housing." This language is also included in Claim 1 as per Appellants Amendment of 2 July, 2001. Consequently, no interpretation of the claim in light of the specification is necessary. Wolters fails to protect against poisoning from this environment. Consequently, the rejection of Claim 1 as being unpatentable over Wolters is believed untenable and the invention is believed patentable for at least these reasons.

Dependent Claims 2-7 depend from independent Claim 1 discussed above and are believed patentable for at least the same reasons. In addition, however, each is also deemed to define an additional aspect of the invention, and should be individually considered on its own merits.

CONCLUSION

For all of the above reasons, it is respectfully submitted that the final rejection of Claims 1 and 3-7 is in error. Accordingly, reversal of the final rejection of each of these claims is respectfully solicited.

This brief is being filed in triplicate.

The Commissioner is hereby authorized to credit any overpayment or charge any fee (except the issue fee) to Account No. 14-1270.

Respectfully submitted,

By 

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APPENDIX

1. A semiconductor device comprising integrated circuit elements realized in a stack of layers on a substrate and comprising means for preventing pollution of the circuit elements and of the substrate by hydrogen originating from an environment inside a housing enclosing a portion of the semiconductor device, characterized in that said means are formed by a layer of a material which absorbs hydrogen, referred to as hydrogen getter (10), which forms a pattern which is integrated with the circuit elements and of which an external surface (11) is exposed and in contact with said environment.

2. A device as claimed in claim 1, characterized in that the hydrogen getter layer is formed on a surface of the substrate and in that the circuit elements comprise an upper protective layer which has an opening for exposing the upper surface (11) of said hydrogen getter layer (10).

3. A device as claimed in claim 1, characterized in that the hydrogen getter layer is realized simultaneously with a layer of a same material from which elements of the integrated circuits are formed, and in that the circuit elements comprise an upper protective layer which has an opening for exposing the upper surface (11) of said hydrogen getter layer (10).

4. A device as claimed in claim 1, characterized in that the hydrogen getter layer forms patterns arranged between the integrated circuit elements or patterns arranged along a periphery of the integrated circuits.

5. A device as claimed in one of the claim 1, characterized in that the semiconductor materials belong to the chemical group III-V.

6. A device as claimed in any one of the claim 1, characterized in that the material of the hydrogen getter layer comprises palladium (Pd).

7. A device as claimed in any one of the claim 1, characterized in that the material of the hydrogen getter layer comprises titanium (Ti).